

Electric Utilities and Water Emerging Issues and R&D Needs

Southern States Perspective on the Water-Energy Interface

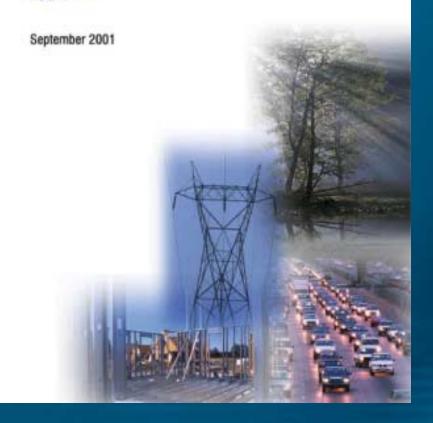
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July 23, 2002 Pittsburgh, Pennsylvania



Energy Policy in the South

Integrating Energy, Environment and Economic Development: A Balanced and Comprehensive Approach





SSEB/SGA Member States & Territories

Alabama

Governor Don Siegelman

Arkansas

Governor Mike Huckabee

Florida

Governor Jeb Bush

Georgia

Governor Roy E. Barnes

Kentucky

Governor Paul E. Patton

Louisiana

Governor M.J. "Mike" Foster, Jr.

Maryland

Governor Parris N. Glendening

Mississippi

Governor Ronnie Musgrove

Missouri

Governor Bob Holden

North Carolina

Governor Michael F. Easley

Oklahoma

Governor Frank Keating

Puerto Rico

Governor Sila M. Calderon

South Carolina

Governor Jim Hodges

Tennessee

Governor Don Sundquist

Texas

Governor Rick Perry

U.S. Virgin Islands

Governor Charles W. Turnbull

Virginia

Governor Mark Warner

West Virginia

Governor Bob Wise



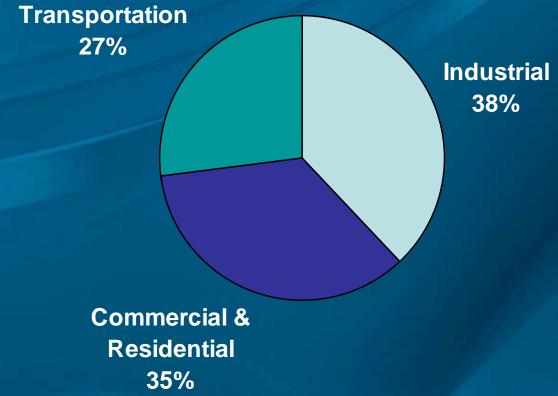
Energy Security and Stability

- ☐ 1999 U.S. consumed 97 quadrillion BTUs
- □ 1999 U.S. produced 72 quadrillion BTUs (75%)

"To promote energy security and stability policy makers should evaluate current domestic fuel production and ensure that a variety of fuels are available to meet energy needs." Energy Policy in the South



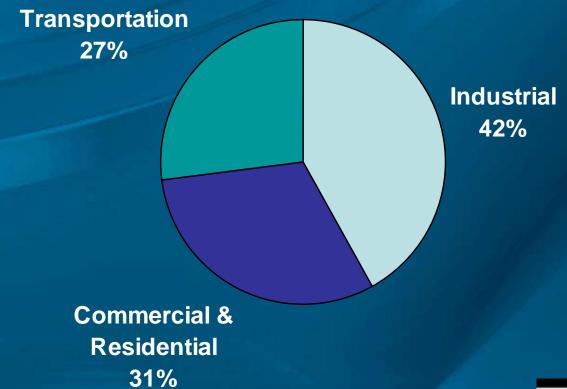
U.S. Energy Consumption by End Use Sector



Source: DOE/EIA-0035



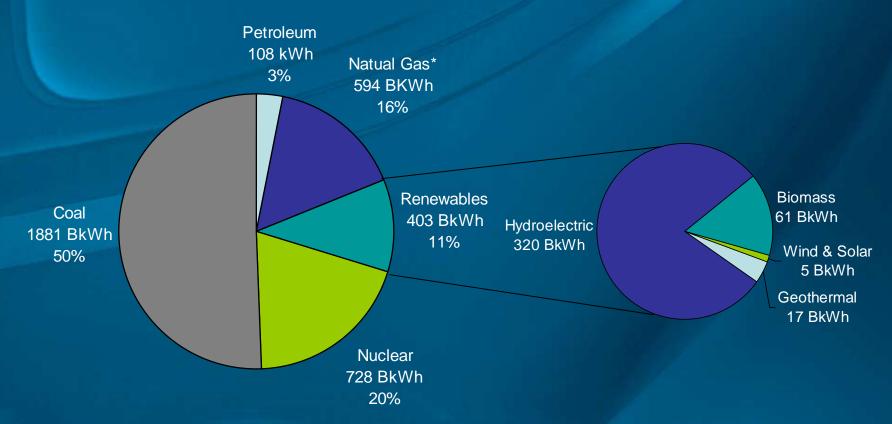
Southern States Energy Consumption by End Use Sector



Source: data adapted from DOE-EIA-0035



U.S. Electricity Generation by Source



Source: EIA Monthly Energy Review Feb. 2001 (DOE/EIA-0035 (2001/02))

Totals do not equal 100% due to rounding

*Also includes other gases (approx. 11 billion kWh)



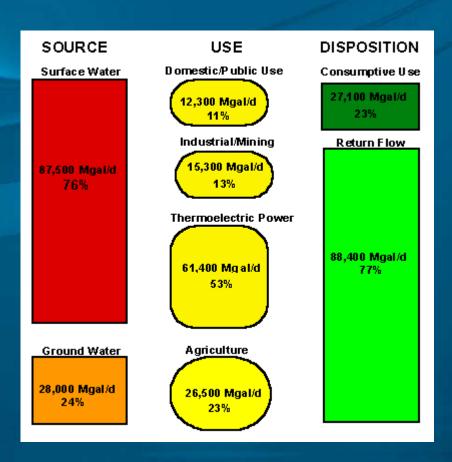
Southern Water Supply Roundtable

Program Initiatives

- Data acquisition and dissemination
- ☐ Conservation and end-use efficiency
- Educating the public and decision-makers
- Planning and conflict resolution



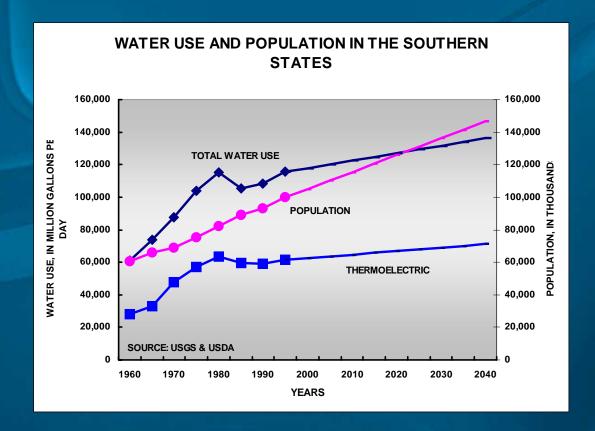
Source, use, and disposition of an estimated 66,900 Mgal/d of freshwater in the Southeast, 1995



- Surface water subject to drought
- Ground water consumption outstripping recharge capacity
- Only 15% of water used is consumed; 85% is returned to stream as wastewater
- Thermoelectric power is largest water user
- Agricultural use increasing in south faster than other regions



Water Use and Population



Industrial Use

- Declined in past 20 years due to cooling tower requirements and conservation
- Will trend upwards over next 40 years, tracking economic expansion

Irrigation

- Declining in West as water availability declines and cost increases
- Expected to increase dramatically in Southeast over next 40 years

Domestic Use

Will continue to grow as population increases



Water for Energy: Use & Consumption

- Energy production a major water user in South. Fossil and nuclear energy sources use water for steam-generation and cooling; hydropower for turbines.
- ☐ Coal accounts for about half of electricity generation and requires over 3 gallons of water to produce each kilowatt hour.
- Combined cycle coal, nuclear, gas and oil generation plants consume some water but return the balance with elevated temperature and solids content.



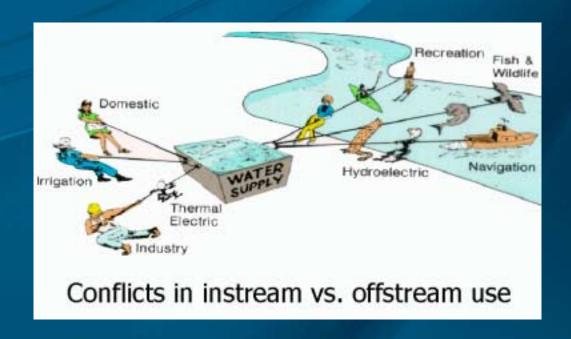
Energy Uses May Conflict With Other Water Uses

- Adequate water supplies are critical to urban development and agricultural expansion.
- Sewer and water connection restrictions are growing within the Southern Region.
- State regulators are encouraging power plants to use treated effluent water as an alternative source.



Conflicts in instream vs. offstream use

- Conflicts are arising over policies for instream water use.
- Population growth and economic development increase offstream demand.





Alternate Water Supplies

- construction of small reservoirs
- water conservation
- recycling and reuse
- changing crop patterns
- reclaimed waste water
- conjunctive use of surface and ground water
- regional planning and cooperation
- □ Aquifer Storage and Recovery (ASR)



Impacts of New Energy Plants on Water Supply Are Localized

- Gas fired plants concentrate where electric and natural gas transmission lines intersect with adequate water supplies.
- Coal fired plants concentrate where mines and railroads intersect with electric transmission lines and adequate water supplies.
- Other industries have infrastructure requirements similar to electric generation and place additional demands on localized water requirements.



Downstream Impacts on Water Supply and Quality Are Regionalized

- Use and consumption of water limits opportunities for downstream users.
- Water wars have erupted on an interstate basis.
- Energy facilities are the focus of many interstate air and water issues.
- Regional, multi-state solutions are necessary to assure reliable energy, while safeguarding water supplies.



Hydropower Relicensing A Concern in the South

- An important issue is balancing hydropower generation with other instream flow needs.
- □ TVA's Reservoir Operations Re-study for seven states, to be completed in 2003, examines power generation and competing needs.
- Section 401 of the Clean Water Act forbids FERC from relicensing a hydropower project until affected states certify compliance with water quality standards.





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